

ANNALS OF SURGERY.

ON THE REMOVAL OF ENORMOUS VESICAL CALCULI BY THE SUPRA-PUBIC ROUTE WITH REPORT OF A RECENT SUCCESSFUL CASE.

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PATIENT. æt. 55 years, from Renovo, Pennsylvania, was admitted to the University Hospital May 4, 1889, with the following history:

He had been troubled with symptoms of vesical irritability for 26 years, suffering severe pain during urination, chiefly at the end of the penis. He had always been a moderate drinker, usually of beer; he was a constant sufferer from dyspepsia.

Examination of urine: Specific gravity 1012, reaction alkaline, small amount of albumen, accounted for by the pus present; no sugar.

Microscopically: Abundant bladder cells, pus, and triple phosphate. No casts.

Sounding clearly demonstrated the existence of a calculus in the bladder, and gave the impression that it was of moderate size, as the peculiar click was only to be elicited when the point of the sound was turned in a particular direction. On May 8 the patient was etherized and a lithotrite was introduced into the bladder. Repeated efforts were made either to seize or to crush the stone, but were unsuccessful, the points of the instrument seeming to slide over the surface of the stone and, always without taking hold. I remarked to those present that I was dealing either with an encysted calculus, or with one of the largest size,

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or with both; that the stone was apparently a hard one, as not the smallest particle was brought out by the blades of the instrument, and that for these reasons the supra-pubic operation was indicated. This I at once proceeded to perform.

In the absence of a rectal colpeurynter, a half dozen small sponges fastened to silk threads were inserted into the rectum. Ten ounces of boracic acid solution were injected into the bladder, bringing it well up toward the umbilicus. A piece of rubber drainage tube was tied around the penis to prevent the exit of fluid. I then opened the bladder in the usual way, making a small incision immediately above the pubes. On dividing its interior wall with the knife, the point of the latter impinged directly upon the stone, which was another evidence of its unusual size. On putting my fingers into the bladder I found it was nearly filled with an enormous calculus occupying the *bas fond*, and covered over at least three-fourths of its surface with folds of mucous membrane held tightly in place by strong bands of lymph. It was with great difficulty and only by the exercise of considerable force, that I was able to strip this covering from the stone. I finally succeeded in doing so, using the pulps of my fingers so as to do as little violence as possible to the tissues. The wound in the bladder wall and that in the soft parts were enlarged upward, the stone seized with the forceps, and, finally, delivered. Two large drainage tubes were introduced through the wound into the bladder, and two superficial sutures were placed in the soft parts. The bladder was washed out every three hours with a saturated solution of boric acid with 1:5000 bichloride of mercury. The bichloride caused an erythema around the wound and phenol sodique 1 to 10 of water was substituted. One drainage tube was removed May 22, the remaining tube May 27. A soft catheter was passed through the urethra and retained in position. On June 3, the wound was almost healed and the catheter was removed. A small amount of urine found its way through the wound. On the following day the temperature rose to 101.8°. There has been no movement of the bowels for some days. The constipation was overcome by a dose of Rochelle salts, and the catheter was replaced June 7. The temperature at once fell to normal, and remained so. No urine passed through the wound after June 10.

On June 14, the catheter was finally removed, and the patient left the hospital entirely well June 17. A careful examination of his urine at this time revealed nothing abnormal.

The patient made a practically uninterrupted recovery, although the length of time the disease had existed, the close adhesions of the stone

to the bladder walls, its enormous size, necessitating not only a larger wound than usual, but also causing considerable damage to the edges of the wound during the removal of the stone, all led me to feel great anxiety as to the result of the case. The stone weighed at the time of its removal, nearly $9\frac{1}{2}$ ounces (4550 grains); its greatest circumference was $8\frac{1}{2}$ inches, and its transverse circumference $7\frac{1}{2}$ inches. The patient sat up on the 25th day, and the wound was entirely closed at the end of $4\frac{1}{2}$ weeks.

I have to-day received a letter from him, in which he says that he has never been better in his life.

This case seems to me of special interest from three points of view:

1. The absence of fatal kidney disease in a case of such long standing, and in the presence of such an extreme source of urethral obstruction, frequent urination, etc.
2. The encysted condition of the calculus.
3. Its unusual size and weight.

I am quite aware that many cases have been recorded in which enormous calculi have been found after death in the bladder of patients who died from intercurrent disease, or from conditions not directly involving or dependent upon the urinary tract.

In the majority of instances, however, it is probable that when a stone attains a weight of more than two or three ounces and is carried for any length of time, it produces a condition analogous to that which I found in the case of a patient from whom I removed post-mortem a calculus weighing 532 grains.

He came to me with a history of long standing vesical calculus, which was easily confirmed on examination, and which also showed that the stone was probably of extremely large size; I therefore decided upon the supra-pubic operation, to which the patient consented. He was extremely weak, and had a profuse dysenteric diarrhœa.

The night before the day fixed for the operation he suddenly died, and the autopsy, which I conducted the following afternoon, showed a condition of the kidneys which made it marvellous that he lived so long. The entire secreting structure had

disappeared, and the organs were transformed into multilocular sacs containing enormous quantities of muco-pus. The ureters were dilated to almost the calibre of the small intestine. The bladder contained a calculus weighing 532 grains. The origin of this dilatation of the ureters and kidneys in such cases is of great interest, as no appreciable obstacle to the entrance of urine into the bladder is usually discoverable. It seems probable that in some instances the dilatation is brought about by the frequent contraction of the walls of the bladder, each act of this character temporarily interrupting the flow of urine through the vesical end of the ureter. This, taken in conjunction with the extension of inflammation from the bladder by continuity, probably explains the condition. An operation would have been certainly fatal, and I was thankful to have escaped the additional risk of death during the use of ether. The urine was so loaded with vesical debris that the condition of the kidney could not be ascertained with any certainty.

A brief review of the history of some of the cases in which excessively large stones were operated upon will show at once that the patients were almost invariably in a condition which rendered surgical interference surely and more or less rapidly fatal. As Keyes says: "Surgical works on this subject teem with rare and curious cases of calculi of great size and weight, the largest of which will be found to have been taken from dead bodies, and the next in size pretty uniformly to have brought about fatal results by their removal during life."

Among examples of unsuccessful attempts to extract large stones may be mentioned the case operated upon by Vitellius and recorded by Fabricius Hildanus, in which the stone weighed 22 ounces.

Geyer details one in which the fragments weighed 10 ounces.

Charles Preston mentions one taken from a priest, in 1690, and preserved in the Charité Hospital of Paris. It weighed 51 ounces, but the patient died before the operation was completed. Borellus describes one of 18 ounces extracted by Quesnotus. Marteau removed one of 14 and another of 12 ounces. Mr. Birch extracted one of 16 ounces from a man in

St. Thomas' Hospital; Deguise one of 31 ounces. Graefe, of Berlin, extracted one of 21 ounces; LaMotte, Vidal and Eller all mention examples of 12 ounces. In all those cases the patients died in from one to ten days. In a case of Sir Astley Cooper's, in which the stone weighed 16 ounces, the patient survived only 4 hours and in the case of Mr. Dalrymple, of Norwich in which the operation was abandoned before its completion, and the patient died in three hours, the weight of the calculus was upward of 12 ounces. Mr. Erichsen reported a case (*Lancet*, 1885) of a primipara in whom a large tumor was found obstructing the outlet of the pelvis, and necessitating craniotomy. A month later a stone was removed by the vesicovaginal operation. It weighed $5\frac{1}{2}$ ounces, and measured 8 inches in the long and 6 inches in the short circumference. The patient died in eight days, and at the autopsy extensive disease of the kidneys was found, the right being converted into a mere cyst while the left was in a state of chronic pyelitis with great dilatation of the ureter.

Sir James Earle reported (*Lancet*, 1853) the case of Sir Walter Ogilvie, Baronet, of Dundee, who, at the age of 23, became paralyzed from the effect of a blow on the back. Twenty years later Mr. Benjamin Bell diagnosed stone, and recommended extraction, but the operation was declined. At the age of 53, the patient's sufferings became so violent that he determined to have it extracted.

In consultation with Mr. Cline, the operation of suprapubic lithotomy was thoroughly considered, and concluded to be "uncertain and dangerous, because the bladder, thickened and exquisitely irritable, could not be further distended with fluid, and the stone, although so large, had not raised it sufficiently high to obviate the danger of wounding the peritoneum and penetrating into the cavity of the abdomen. The usual lateral operation was, therefore, judged to be the only safe and probable means to be attempted." This was accordingly performed, but it was found impossible either to seize the stone in the forceps or to crush it and extract it piecemeal. The patient died 10 days later, and a stone was found weighing 44 ounces, and completely filling the bladder and the bony pelvis. Earle

was at one time shown a calculus weighing $18\frac{1}{2}$ ounces, extracted by Cheselden. The patient died the following morning.

Mr. T. Holmes has recorded (*Trans. Path. Soc.*, 1870, vol. xxi. p. 267) the case of a calculus weighing 25 ounces, removed after death from the bladder of Sir Thomas Adams, a baronet, who died at Sprowston Hall, near the city of Norwich, during the reign of Charles II. The stone was of uric acid, and measured $12\frac{1}{2}$ inches in its longitudinal circumference. Sir Thomas was able to be up and about until he met with an accident. He died at 81 years of age. The stone is now in the museum of St. Thomas' Hospital, London, of which institution he was president about the year 1662.

In the museum at Cambridge there is a 32 ounce calculus, taken from a woman who died about the same time. Mr. de Morgan describes two large calculi now in the Canterbury Museum, removed after death from the same patient, and weighing together $22\frac{1}{2}$ ounces.

Mr. Holmes has also reported (*Trans. Path. Soc.*, London, 1874, vol. xxv, p. 181) a case in which unsuccessful attempts were made at both lithotrity and lithotomy, and the patient died the day following the latter attempt. A stone weighing 3,620 grains was found filling the bladder and the prostatic urethra. It was 3.8 inches in length, 2.8 inches wide and 2.6 inches thick. After all the soft parts had been cleared away from the pelvic bones, it was found just possible to push this stone out from the pelvis through its lower outlet.

Mr. Robert Hardey records (*London Medical Gazette*, 1829, vol. iii., p. 569) the case of a man, æt. 66 years, from whose bladder he, after death, extracted a stone weighing $27\frac{1}{2}$ ounces avoidupois, its greatest circumference being $15\frac{1}{2}$ inches.

Sir Henry Thompson reports (*London Lancet*, 1857, vol. ii., p. 474) the case of a patient, æt. 46 years, from whom, after death, a calculus was removed weighing 12 ounces, and measuring $9\frac{1}{2}$ inches in its transverse diameter, and $10\frac{1}{2}$ inches in its greatest longitudinal diameter. The nucleus was composed of uric acid, but the external layers contained urate of

ammonium and phosphatic laminæ. He had urinary symptoms since he was æt. 15 years. Sir Henry Thompson remarked that when he came under his care, about 9 months before his death, the idea of extraction was not entertained because the stone was found to fill the bladder completely. In a case recorded by Mr. Williams, a uric acid calculus, which weighed 25 ounces, and measured $10\frac{1}{2}$ inches in its short circumference and $12\frac{1}{2}$ inches in its long circumference, was removed, after death, from the bladder of a gentleman, æt. 81 years.

Dr. Augustus Browne records (*Trans. Path. Soc.*, London, 1868, vol., xix. p. 277) the case of a man, æt. 42 years, who had symptoms of stone in the bladder for 25 years, having been afforded relief only by drinking an extraordinary mixture of gin and beer. He died with symptoms of uræmia. The bladder was found contracted upon 3 calculi, the total weight of which was $1\frac{1}{4}$ pounds less 20 grains. Externally they seemed to be composed of triple phosphate.

Charles Monod has reported (*Bulletin de la Société de Chirurgie*, Paris, 1881, p. 762) the removal of a stone weighing 1,950 grains, by suprapubic lithotomy, in which case, the patient having nearly recovered, but a small fistulous orifice remaining unhealed, 1 or 2 injections of tincture of iodine were used, being thrown into the small suppurating cavity situated behind the abdominal wall and communicating with the fistula. This was followed by erysipelas, and the patient died on the 40th day after the operation. The same surgeon records another case in which he extracted a stone 90 millimetres in length, 75 millimetres in width, and 58 millimetres in thickness, weighing 346 grammes, or about 5,200 grains. The patient died on the 5th day.

These cases sufficiently illustrate the history of the exceedingly large stones which have been mentioned in surgical literature as having been found after death, or as having been the object of unsuccessful surgical attack during life.

2. The second point to which I have alluded is the incarceration of the stone by means of such firmly organized lymph and by such a projection of the mucous membrane around about it that it practically lay in a cavity of its own, communicating

with the bladder by means of the aperture through which a portion of its convex surface protruded. The mode of formation of these cysts containing calculi is variable. In the majority of patients of the age of this one, it has always seemed to me probable that the condition was brought about primarily by enlargement of the prostate causing vesical hypertrophy with distention, and with the protrusion of the mucous membrane between the fibres of the detrusor, which gives rise to the well-known "sacculated bladder" of old people. Cross mentions a case in a man, *æt.* 84, where such a sacculus held a gallon.

These cysts thus formed have no muscular fibres, and, of course, no power of completely evacuating their contents, although they may do so partially by aid of the abdominal muscles. A certain amount of "residual urine," therefore, always remains in them, decomposing, throwing down a sediment, and setting up a catarrh, the mucus of which binds together the crystals and sedimentary deposit, forming the nucleus for the stone. In this instance, however, the symptoms date so far back into middle life (beginning when he was *æt.* 29 years) that this explanation hardly seems entirely satisfactory, and it appears more probable that the cyst was formed by the gradual sinking of the stone, as it grew, into a pocket made by its own weight, the hypertrophied and thickened mucous membrane rising above its borders and becoming fastened to it by lymph-bands.

According to Keyes, an encysted stone is either partially within the bladder and partly encysted, the neck of the cyst forming the obstacle to removal, or the orifice of the cyst is so small that to all intents and purposes the calculus is extravescical.

For the former set of cases, if the stone be of moderate size, and if the condition be discovered during a perineal lithotomy, after the part projecting into the bladder has been removed, or before, in some cases, the operator endeavors with his finger-nail, or a director, a searcher, a scoop, or other elevator, to dilate or slightly tear the neck of the cyst and work out the calculus. In this manœuvre, pressure upon the hypo-

gastrium or through the rectum may be of great assistance. If moderate manipulation fails to dislodge the stone, a curved, probe-pointed, long bistoury may be used with great caution upon the finger as a guide, to cut moderately the constricted edge of the neck of the cyst in one or more places. Such use of the knife involves risk, and it rests with the operator to decide according to the circumstances of each case whether to assume the risk, or to resort to supra-pubic section.

In the case of a large pouch connected with the bladder, and containing a small stone, the neck of the pouch may be dilated with the finger or small forceps, and the stone reached.

When the stone is practically outside of the bladder, or in a dilated ureter, some operators prefer to leave it untouched. Thompson acted in this way in the presence of a stone in the ureter. It is plainly the surgeon's duty to cut scantily in such cases.

That the incarceration of a calculus adds greatly to the difficulties of its extraction has always been recognized by lithotomists.

Mr. James Miller, Professor of Surgery in the University of Edinburgh; described (*Monthly Journal of Medical Sciences*, 1848, p. 574) the removal of two stones, one of which, the size of an egg, was easily extracted, but the second was so encysted that great difficulty was experienced in seizing it, and the soft parts adherent to it had to be carefully stripped from it with the tip of the forefinger before it could be freed and removed. The patient died about a month after the operation from Bright's disease and pyelitis, and an abscess of large size was found in the right kidney.

Various proposals exist for dealing with encysted and sacculated stones. Littré advised seizing hold of the stone and cyst in the way described, and using it roughly, with the object of bruising the soft parts so as to cause suppuration in them, and disintegration of them; and with the hope of the stone (if not itself broken) becoming loosened during the suppurative stage, dropping into the bladder, and thence being extracted at another time.

Garengéot, with a bistoury, divided the neck of the sac, and then used forceps. Peyronie, LeDran, Marechal and others, have trusted to catching hold of the projecting part of the stone, and pulling violently, so as to detach it from its adhesions. Desault employed a concealed knife, or "coupe-bride," or "kystotome," for dividing the cyst. Among the older writers some have advised the stone to be left undisturbed, in hopes that the wound would heal, and that the patient would be left little worse, if no better, than when he was found.

Scheutzer (*Medical, Chirurgical and Anatomical Cases*, London, 1758) details the case of a clergyman, æt. 60 years, who for twenty years had felt a pain in the urethra with some obstruction in making water. Stone being diagnosed the operation for "its removal was performed according to the great apparatus." The operation was extremely tedious and difficult, but the stone was finally removed, after more than an hour's efforts. It was encysted and projected from the bladder into the prostatic urethra. It weighed five ounces. The final result is not stated.

Dr. Newbigging reported (*Monthly Journal of Medical Sciences*, 1848, p. 690) a case of encysted stone in which the adhesions had to be stripped from it with the finger in the same manner before its extraction could be effected. The stone was of large size but its weight was not given. The patient recovered.

Mr. Fergusson reported (*Transactions of the Pathological Society of London*, vol. vii, p. 84) a case in which a small stone having been recognized and crushed, the patient died 20 days later. A stone the size of an orange was found at the autopsy in a cyst at the right side of the bladder immediately behind and above the prostate gland. The opening communicating with the cavity of the bladder was about the diameter of a sixpence. The patient had suffered with urinary symptoms for twenty-six years. Mr. Fergusson remarked that the specimen was interesting from the great size of the stone, from the length of time it probably existed in this situation, from the slight irritation it had caused, and, lastly, from the rareness with which calculi are found in this precise locality.

Mr. Henry Lee presented to the Pathological Society of London (*The Lancet*, March 29, 1862, p. 328) a calculus for the removal of which median lithotomy had been performed. The stone was found to be impacted and immovable and could not be grasped by the forceps. Portions were broken off and at length were removed by the scoop. They weighed altogether nearly four ounces. The patient died three or four days afterward.

Mr. Erichsen reported (*The Lancet*, 1853, vol. i, p. 56) a case of encysted calculus in a patient who had had severe symptoms of stone in the bladder for several years. On several occasions Mr. Erichsen and his colleagues had heard the characteristic sound while the patient was being examined in the wards, but when he was placed upon the operating table, they failed to find it. He died about three years from the time he first came under observation, and a cyst was found upon the right side of the bladder containing two calculi, but the opening of the cyst was only large enough to admit the point of a middle-sized catheter. Mr. Erichsen congratulated himself upon having adhered to the rule never to cut for stone unless the presence of the calculus shall have been distinctly made out by percussion with the staff a few minutes before the operation. He adds: "The case which we have this day to bring before our readers offers a beautiful illustration of the soundness of the above mentioned caution handed down to us by our forefathers, for the post-mortem showed very plainly that though there was really a stone in the bladder, none of the means at our command could have accomplished its extraction even with a very large incision." Like most of the authors I have quoted, he does not seem even to have taken into consideration the supra-pubic operation.

Mr. W. Cadge, in an article on sacculation of stone in the bladder (*The British Medical Journal*, October 2, 1875, p. 418), has called attention to the dangers of lithrotrity in such cases resulting from an injury to the walls of the bladder during the crushing, or the attempts at crushing.

3. As to the unusual size and weight of the calculus.

The stones larger and heavier than this which have been successfully extracted are very few :

Le Cat has recorded, 1774 (*Philosophical Trans.*, London, vol. xi. p. 238), a successful operation on a boy, æt. 12 years, of a removal of a stone which filled the entire bladder, but does not give either its weight or dimensions.

In 1818, Charles Mayo, Esq., of Winchester, operated upon a man, æt. 28 years, and extracted a stone of 14 ounces and two drachms, avoirdupois; it measured $8\frac{1}{2}$ inches in its smallest circumference, by rather more than 10 in the largest, and broke into several big pieces in the attempts to extract it.

Mr. Dickinson, of England, successfully removed, from a man, æt. 62 years, a calculus of a globular shape, composed chiefly of phosphate of lime, and which weighed 11 ounces. It broke into several fragments, which were taken away piecemeal. The operation was followed by sloughing of the rectum, and when the case was reported, several months afterward, a small fistulous opening still existed between this cavity and the bladder.

Mr. Earle, in his "Remarks on the Danger of Extracting Large Calculi" (*Medico-Chirurgical Transactions*, London, 1821, vol. ii., p. 69), says: "The following are the largest successful cases which I have met with: One 15 ounces in weight, and $4\frac{3}{4}$ inches in diameter, extracted in 1746, by Mr. Harmer, of Norwich, related in Gooch's Surgical Observations p. 54. The patient survived, but the wound never healed. One of 13 ounces 30 grains in weight, $3\frac{1}{2}$ inches in diameter, and 8 inches in circumference, operated on by Klein, with perfect success (*Pract. Anisch. der bedeuten; Chir. Oper.*, p. 32). Klein likewise refers to a case related in Mursinna's *Journal f. die Chirurgie*, vol. vi. p. 94, in which a stone of 12 ounces and 2 drachms in weight was successfully removed."

Ambrose Paré mentions the case of a confectioner operated on in 1570, by John Collo, where the stone weighed 9 ounces and was $3\frac{1}{2}$ inches in diameter. (*Lib. 25, ch. 19*). Tolet mentions a case of a stone 10 ounces in weight and $3\frac{3}{4}$ inches in diameter, which was happily extracted, and the patient was recovering from the effects of the operation when an abscess formed in the kidney from the presence of another calculus the patient died on the 9th day after the operation.

Of the prodigious number of cases on which Cheselden operated, the three largest stones successfully extracted weighed 12, 10 and 8 ounces. Mr. Earle adds: "Without citing any more authors, it will be sufficient to state that, as far as my researches into this subject have hitherto led me, very few instances of success are recorded where the stone exceeded 7 or 8 ounces."

Sir Astley Cooper, in an article on "The Size of Human Calculi" (*The Lancet*, 1826, vol. i.), said: "The largest stone I ever saw extracted without its being broken (at the same time the patient surviving), is one that was taken from a person at the Norwich Hospital; it weighed 8 ounces."

A very remarkable case of suprapubic lithotomy, though hardly to be classed with the successful cases, occurred in 1837, in the practice of Professor Uytterhoeven, Surgeon to St. John's Hospital, Brussels. A man, æt. 39 years, a native and resident of Brussels, had labored under vesical disease nearly 27 years, when he was lithotomized. He survived the operation 8 days. The calculus, which weighed upward of 2 pounds, was of gourd-like figure, and was accurately moulded to the shape of the inside of the bladder, being nearly 7 inches in length, upward of 4 inches in breadth at the broadest part, and nearly 2½ inches in thickness. It had a rough, tuberculated surface, and appeared to consist of a number of thin, friable lamellæ. The walls of the bladder were indurated, and an inch thick, except at the point corresponding to the summit of the concretion, where they were completely worn down to the peritoneal coat. They contained several purulent depots and fistulous passages. An immense abscess occupied the left iliac fossa. The small intestine and the mesentery were highly inflamed.

Dr. Rae has reported (*British and Foreign Medical and Chirurgical Review*, 1844) the case of a man, æt. 40 years, who had symptoms of stone for 30 years. The bladder was opened through the perineum by the usual method; the finger introduced into the bladder felt the stone, and an attempt was made to seize it with the forceps. This was found to be impossible, on account of the firm contraction around it and the thickened coats of the bladder.

The patient was much exhausted, and it became necessary to desist after an hour and 40 minutes. The wound was kept open, and seven months later Mr. Ferguson crushed and extracted the stone, which weighed nearly 8 ounces. The patient recovered.

Mr. Bullen, of Ipswich, records (*Lancet*, 1848) a case of the removal of a calculus weighing 7 ounces from a girl, æt. 14 years. It was broken into many pieces before it could be removed. The patient, at the time it was reported, was progressing well.

Dr. Dudley reports (*Southern Medical and Surgical Journal*, 1850) a case of a youth, æt. 15 years, from whom a calculus weighing 9 ounces, and measuring 11 inches in its greatest circumference, was successfully extracted by the lateral operation. The extraction was followed, however, by sloughing of the bulbous portion of the urethra, together with the whole of the accelerator urinæ muscles and a large portion of the perineal connective tissue.

In a table of 96 cases of vesical and urethral calculus operated on by Professor George E. Post, of Beirut, Syria, the largest weighed 1875 grains, or less than 4 ounces, and the case resulted fatally. (*Medical Record*, 1877, p. 469.)

In 131 cases of stone in the bladder operated on in South Carolina, and collected by Dr. Francis L. Parker (*Transactions of the South Carolina Medical Association*, 1878, p. 37), the largest stone removed in one operation weighed 8 ounces, and the next $4\frac{1}{2}$ ounces; none of the others were over 2 ounces.

Dr. C. T. Gardner (*Medical Record*, vol. xiv., 1878) removed a calculus which weighed $12\frac{1}{2}$ ounces, measured in its several diameters, $3\frac{3}{8}$ inches and $2\frac{1}{4}$ inches, and had for a centre a small oxalate calculus, the periphery being made up of phosphates. The operation for its removal was commenced with the lateral section, as the instruments on hand were insufficient to crush it *in situ*. The patient, æt. 48 years, did well after the operation; a rectal fistula which formed from sloughing spontaneously closed.

Dr. Mettauer, of Virginia, is said to have removed a calcu-

lus weighing 16 ounces by the lateral operation ("Eve's Surgical Cases"), but so far as I know, no details of the case have been published.

Gross and Agnew each allude to a case in which Dr. Dunlap, of Ohio, removed a stone of 20 ounces after fragmentation. The patient lived 3 years after the operation. After quoting some of the above-mentioned cases, Gross adds:

"Although the above cases clearly show that a stone, even of large size, may occasionally be successfully extracted, yet it is equally certain that they must be regarded as so many exceptions to the rule, rather than as the rule itself. Most generally, indeed, the patient dies either from exhaustion during the operation, or from the effects of inflammation a short time afterward."

A very few words will suffice as to the diagnosis and operative treatment of such a calculus as this. A stone of this size and shape, freely movable in the bladder, could undoubtedly be seized by the lithotrite and measured in its small diameter, but it is hardly probable that it would be caught in the direction of its length in the one examination which it is customary to make for the purpose of measurement before deciding upon the particular operation to be performed. If the bladder were much contracted, it could not be grasped in its long diameter at all. The existence of a cyst-wall nearly covering it, greatly reducing the area over which the characteristic click of the searcher is obtained, preventing the lithotrite from seizing the stone with any firmness, and rendering it almost immobile, of course adds greatly to the difficulty of diagnosis. Bimanual examination, with a finger in the rectum and another over the hypogastrium, might be of use in persons with very attenuated abdominal walls, but even these would scarcely convey an accurate conception of the dimensions of the calculus. It is probable that the true size of such calculi will generally be discovered in the future as in the past—during the performance of the operation intended for their removal.

As to the choice of that operation there can scarcely be two opinions, supra-pubic cystotomy being so evidently the only available method, and the one to be employed at once when,

as in this instance, the character of the stone is disclosed during the attempt at litholapaxy.

It would, perhaps, be more useful to consider the duty of the surgeon who, having opened the perineum by either the median or lateral section, finds that he is dealing with a calculus of this description. Under these circumstances, the abandonment of the perineal route being imperative, the high operation should be performed, either at once, if the patient is in good condition and well fitted to bear shock, or, if that is thought inadvisable, as soon as the perineal wound has fairly well granulated, the patient then having the benefit of the drainage by that route without the danger of septic absorption.